

# Gr. 8 – Understanding Structures & Mechanisms

## Systems in Action

### Roll Can

**Specific Expectations:**

- 2.1 Follow established safety procedures for working with apparatus, tools, materials, and electrical systems.
- 2.4 Use technological problem-solving skills to investigate a system that performs a function or meets a need.
- 2.6 Use appropriate science and technology vocabulary, including *mechanical advantage*, *input*, *output*, *friction*, *gravity*, *forces*, and *efficiency* in oral and written communications.
- 3.2 Identify the purpose, inputs, and outputs of various systems.
- 3.3 Identify the various processes and components of a system that allow it to perform its function efficiently and safely.

**Big Idea (for lesson):**

Students will build and explore how a mechanism can use its centre of mass to store energy internally, and transform this energy into kinetic movement.

**Accommodations:**

- Increase time
- Visual Aids
- Manipulatives
- Chunking
- Step-by-Step
- Scaffolding
- Copy of Notes
- Student Grouping

**Differentiated Instruction:**

- Content: Use demo to show the content as you offer verbal descriptions.
- Process: Have students work in pairs and support each other if physical impediments exist.
- Product: Students may show their final product in pairs, and communicate their findings either verbally, visually, or through written means.
- Other: \_\_\_\_\_

**Bloom's Taxonomy:**

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

**Multiple Intelligence:**

- Verbal/Linguistic
- Logical/Mathematical
- Visual/Spatial
- Bodily/Kinesthetic
- Naturalist
- Musical/Rhythmic
- Interpersonal
- Intrapersonal

**Delivering The Lesson:**

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Portion & Timing	Grouping:			Introduction:	Materials
<b>Minds On:</b> <b>10 mins</b>	W <input checked="" type="checkbox"/>	S <input type="checkbox"/>	I <input type="checkbox"/>	Teacher can do a demonstration to introduce centre of mass and reintroduce stability for the lesson; either watch the video or do the demo in-person.  Ask students why they are able to balance the nails, and whether they think there are some other orientations they'd like to try out. If time warrants, let the students try to work together on one other orientation.	Roll Can – Balancing Nails – Sick Science! - #118.mp4  12 Nails Board
<b>Action:</b> <b>15 mins</b>	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input checked="" type="checkbox"/>	Have students build their own Roll Cans according to the instructions on the handout.  Teacher can circulate and ask questions of the different groups: -What do you think happens to the internal workings of the roll can as it's pushed? ( <i>Answer: The elastic winds up tightly, but the bolt actually stays the way it is and the elastic spins around it.</i> ) -What kind of energy do you put into the system? ( <i>Answer: Kinetic energy to make the can move</i> ) -What kind of energy does it change into? ( <i>Answer: mostly elastic energy, but also some sound and friction before turning back into kinetic.</i> ) -Would this keep going forever? Why or why not? ( <i>Answer: No, because energy is being lost to friction and sound, so eventually it will not have enough energy to keep rolling.</i> )	Roll Can Handout (Materials listed)
<b>Consolidate:</b> <b>10 mins</b> <b>(Likely extended into next day)</b>	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input type="checkbox"/>	This lesson has had students visit a lot of energy transfer situations where energy of motion is changed into other types (sound, elastic, etc.). To end the class, you could do a demo where sound from a CD player is transferred into kinetic energy, as outlined on the following link: <a href="http://www.scholastic.com/teachers/cla">http://www.scholastic.com/teachers/cla</a>	CD Player Tall tin can Large balloon Laser pointer Duct tape CD of various genres Mirror

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## *Systems in Action*

			<a href="http://ssroom_solutions/2010/03/investing-energy-transfer-using-music-and-lasers">ssroom_solutions/2010/03/investing-energy-transfer-using-music-and-lasers</a> For another centre of mass video, consult the Balancing Utensils Video	Roll Can – Balancing Utensils Table Trick – Sick Science! #009
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